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ABSTRACT

Approximately 6,500 children are enrolled per year in the New York State Experimental Prekindergarten Program (PreK). In 1975-76 a longitudinal study was begun to determine the program's impact on the development of children while enrolled in the program and in the primary grades. Samples from a population of 5,245 four-year-old prekindergarten children and a control group of 87 children were studied. Data were collected on children's cognitive functioning, social and classroom competencies, personal and family characteristics, school attendance, participation of parents in the prekindergarten program, noninstructional services, and general program characteristics. Analyses of covariance were carried out on three tests of cognitive development with one of the following variables: child's age at pretesting, mother's education, family income, months between pretest and post test, and pretest scores on measure for which post test scores were used as a post test and pretest scores on measure for which post test scores were used as a criterion. A significant positive program effect was found for two of the cognitive measures, the Cooperative Preschool Inventory and the Walker Readiness Test. Analyses of the Peabody Picture Vocabulary Test scores did not show a significant PreK effect, even in the presence of the control variables. (Author/MV)

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PRELIMINARY REPORT OF FINDINGS

Evaluation of the New York State Experimental Prekindergarten Program

June 1977

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INTRODUCTION

The New York State Experimental Prekindergarten Program operates in 49 local school districts and three Boards of Cooperative Educational Services. Each year the program enrolls approximately 6,500 children of which about 5,000 are four year olds.

In 1975-76 a longitudinal study was begun to determine the impact of the prekindergarten program on the development of children while they are enrolled in the program and the primary grades. The study is also designed to identify program factors which have the most impact on children's development.

Questions to be Answered

The original plan for evaluating the Experimental Prekindergarten Program (1975) asked three questions about the effects of the program:

1. Do prekindergarten programs have a measurable effect upon children's cognitive and noncognitive development between the time they enter and leave the program?

2. Do prekindergarten children possess measurable advantages in cognitive development over non-prekindergarten children at the time of entry to kindergarten?

3. Does prekindergarten experience have a measurable effect on children's cognitive development up through the time they complete the third grade?

The plan also contained three questions related to identifying program variables which may influence the development of children:

4. Are there specific variations in prekindergarten programs which result in significantly different levels of cognitive and other development in their students?

5. Can program components or variations be identified which contribute to greater success of particular programs in producing lasting increases in the level of cognitive and other development?

6. Will the systematic collection and analysis of data, carried out in examining the previous questions, provide a baseline for decision makers in studying staff, schedules, objectives, materials, child and parent characteristics, and children's mental ability and cognitive development?

This report addresses the first question by describing results related to cognitive development. Subsequent reports will describe results related to noncognitive development, will deal with effects of variations in programs, and may modify findings related to question 1. The other questions are related to the longitudinal aspects of the study and will be answered by analyses of data collected in the second and succeeding years of the study.

THE SUBJECTS

The children studied during 1975-76 included prekindergarten (PreK) children and control children. The PreK group was made up of approximately 5,000 four-year-old children enrolled in the Experimental Prekindergarten

Program. The control group was made up of 87 children who were eligible for the program in prekindergarten districts but, for various reasons, were not enrolled.

Of the 5,000 PreK children tested in the fall, 2,000 were scheduled to be tested in the spring. This follow-up group was composed of all four-year-old prekindergarten children in seven "in-depth" districts and a sample of approximately 26 percent of the four-year-old children in the remaining 46* districts. The sample was selected randomly within each of the 46 districts so that every child had an equal chance of being selected for the spring testing. Children who were selected but were not available for testing in the spring, usually because they had moved out of the district, were replaced randomly from the remaining children in the same district.

All available children in the control group were tested in the spring.

THE DATA

Data were collected on children's cognitive functioning, social and classroom competencies, personal and family characteristics, school attendance, and participation of parents in the prekindergarten program. Data on noninstructional services and general program information were also collected.

*During 1975-76, 53 districts participated in the Experimental Prekindergarten Program. The number has since dropped to 52.

Cognitive Measures

The Cooperative Preschool Inventory was chosen because it was developed to measure achievement in areas regarded as necessary for success in school. The test was originally constructed to evaluate the first Head Start programs. Standardization of the revised edition took place in 11 Head Start centers.

The test contains 64 items which measure the child's knowledge about his personal world, ability to interact with another person, vocabulary, numerical concepts, awareness of the physical properties of common objects, and ability to execute certain visual-motor tasks.

The Walker Readiness Test is a 50-item, non-verbal measure of general reasoning. It was designed for use with low socioeconomic children and was normed on a sample of approximately 12,000 Head Start children.

The test is divided into four parts and yields separate scores for Similarities, Differences, Numerical Analogies, and Missing Parts. A total score is also obtained.

The Peabody Picture Vocabulary Test is a measure of the ability to respond to verbal concepts presented orally. The child is shown a set of four pictures as the examiner says a stimulus word. The child is instructed to select the picture which is associated with the stimulus word.

The test has received wide use since it was first published in 1959. The original standardization was carried out on 4,012 cases.

The test yields Mental Age and I.Q. scores; however for purposes of the present study, the raw scores were used in the analysis of data.

The test contains 150 items and can be used with persons ranging in age from two years, six months to eighteen years. However, an individual child is administered a much smaller number of items, depending on the number and sequence of correct and incorrect responses.

Ratings of Social and Classroom Competencies

In selecting instruments for measuring children's social and classroom competencies, consideration was given to the goals of the prekindergarten program and to the usability of the instruments by classroom teachers. Both measures selected have been reviewed favorably in the professional literature and were used in a longitudinal study of Head Start children.

The Classroom Behavior Inventory is an 18-item rating scale designed to be completed by the child's teacher. It measures three dimensions of classroom behavior. One deals with task-oriented behavior and attentiveness. A second reflects factors associated with considerateness. A third measures social initiative.

The California Preschool Social Competency Scale is a 30-item scale designed to assess work habits, social responsibility, communication, and interpersonal relations.

Additional Data

Data collected also included personal characteristics of children, parents' occupations and levels of education, number of siblings, living

conditions, attendance, and type and amount of parents' involvement in the program. Information about the program included class size, previous school experience of children, and the nature and extent of noninstructional services provided to prekindergarten children.

COLLECTING THE DATA

In the fall of 1975, the staff of the Prekindergarten Evaluation Unit held orientation sessions for local school personnel. All local staff who were involved with the prekindergarten program were invited. Staff of the Bureau of Child Development and Parent Education also attended. The sessions covered: 1) an overview of the evaluation plan; 2) a description of each of the instruments and forms; 3) general guidelines for collecting data; and 4) instructions for administering the instruments and filling out the forms.

The tests were administered by local school personnel. In most districts, the teachers administered the tests. However, some districts made other arrangements: for example, having the testing done by school psychologists. The two rating forms for each child were completed by the classroom teacher.

The fall testing began later than planned because of the late date on which funds for test materials were released. For that reason, the fall testing was not a true "pretest" and the interval between fall testing and spring testing was unduly short, about 5½ months. The testing in subsequent years is planned to span a more substantial part

of the full school year. For the first year of the study, pretesting of most of the four-year-old prekindergarten children was completed by the end of January.

Data on personal and family characteristics were collected on each child early in the school year. Records were kept throughout the year on parents' participation in the program and on the attendance of each child. Data were also collected on the health, social, and special services which were provided to the prekindergarten children during the school year.

To find a control group, the districts with prekindergarten programs were surveyed to determine how many children were eligible for the program but were not enrolled. More than 100 children were identified. Testing was done in those districts with a sufficient number of children to make it economically feasible. The three cognitive instruments were administered to 108 children. Because the two rating scales are based on observations of children in classroom situations, they were not applicable to the control group. Data on personal and family characteristics were collected on each child in the control group.

Spring testing began in May. All four-year-old prekindergarten children in the in-depth districts and approximately 26% of the children in the remaining districts were tested, as called for in the sampling plan. The loss of children from the programs in the in-depth districts (where they could not be replaced as they were in other districts) brought the total number of children tested in the spring to approximately 1,900. Eighty-seven control-group children were tested in the spring.

CHARACTERISTICS OF PREKINDERGARTEN CHILDREN

In the fall of 1975, the Experimental Prekindergarten program enrolled 5,245 four-year-old children in 50 local school districts and three Boards of Cooperative Educational Services. (Since then, one local school district has dropped out of the project.) Of the total number of children, 1,308 were enrolled in 9 community school districts in New York City, 1,262 were enrolled in 14 districts in Nassau County, and 576 were enrolled in 8 districts in Westchester County. The remainder of the children were enrolled in districts scattered through much of the rest of the state.

The remainder of this section presents the distributions of the prekindergarten children on a number of characteristics. Because data were not complete for some children, the frequency counts may not add up to 5,245.

The children were distributed quite evenly by sex, as indicated by Table 1.

Table 1

Distribution of Children by Sex

	Frequency	Percent
Female	2,650	50.5
Male	2,595	49.5
Total	5,245	100.0

The social or cultural groups most heavily represented were Black and Caucasian. More than 40 percent of the children fell into each of these categories. About 13 percent of the children were Puerto Rican-Spanish. The remainder of the children were distributed among five other categories. (Table 2.)

Table 2

Distribution of Children by Racial or Cultural Group

Racial or Cultural Group	Frequency	Percent
American Indian	13	*
Black	2,085	42
Oriental	83	2
Caucasian	2,075	42
Puerto Rican-Spanish	660	13
Indian-Spanish	39	1
West Indian	29	1
Asian, Non-oriental	3	*
Total	4,987	100

*Less than .5 percent.
NOTE: Percentages do not total 100 because of rounding.

Fourteen languages were identified as the primary language of the prekindergarten children. English was the primary language of about 82 percent of the children and Spanish of about 14 percent. Each of the remaining languages was the primary language of no more than one percent, as presented in Table 3.

Table 3

Distribution of Children by Primary Language

Language	Frequency	Percent
English	4,191	82
Spanish	723	14
Italian	74	1
Chinese	61	1
French	26	1
German	1	*
Polish	6	*
Vietnamese	4	*
Portugese	8	*
Yiddish	1	*
Greek	16	*
Arabic	5	*
Korean	4	*
Filipino	2	*
Total	5,122	100

*Less than .5 percent.

Eighty-nine percent of the children were monolingual. Approximately seven percent were reported as having English as a second language and three percent as having Spanish as a second language. Each of the other languages was the second language for one percent or less of the children (Table 4.)

Table 4

Distribution of Children by Second Language

Language	Frequency	Percent
English	371	7
Spanish	153	3
Italian	31	1
Other	32	1
Monolingual	4,658	89
Total	5,245	100

NOTE: Percentages do not total 100 because of rounding.

Most of the children (91 percent) had no previous experience in the Experimental Prekindergarten Program. These children entered the program for the first time at the age of four years in the fall of 1975. Approximately six percent of the children had nine or ten months of previous experience in the program, indicating that they had been in the program for the entire previous year as three year olds. The remainder of the children had previous experience in the program ranging from one to twelve months. These figures represent those children who entered the program during the previous year as well as those who were in a full-school-year program plus a summer program. (Table 5.)

Table 5

Distribution of Children by Months of Previous Experience in the Experimental Prekindergarten Program

Months of Experience	Frequency	Percent
0	4,757	91
1-8	158	3
9	101	2
10	190	4
11-12	19	*
Total	5,225	100

Mean = 7
Standard Deviation = 2.5
*Less than .5 percent.

A similar pattern was observed in the experience of the children in other prekindergarten or similar preschool programs, such as Head Start. Almost 95 percent of the children had no such experience. Three percent had nine or ten months in other programs. (Table 6.)

From Table 5 and Table 6, it appears that more than 14 percent of the children had some previous educational experience, with almost 10 percent having as much as nine months of previous experience.

A different picture is given if other kinds of programs — those that are not necessarily described as educational programs — are considered. Such programs include Sunday School, day camp, recreation program, nursery school, and similar programs. More than 93 percent

Table 6

Distribution of Children by Months of Previous Experience in Other Prekindergarten Programs

Months of Experience	Frequency	Percent
0	4,944	95
1-8	87	2
9	30	1
10	124	2
11	2	*
12	41	1
Total	5,228	100

Mean = 5
Standard Deviation = 2.1
*Less than .5 percent.
NOTE: Percentages do not total 100 because of rounding.

of the children were exposed to some kind of preschool program other than prekindergarten. (Table 7.)

Table 7

Distribution of Children by Exposure to Other Preschool Programs

	Frequency	Percent
No Exposure	342	7
Exposure	4,898	93
Total	5,240	100

More than half of the children's mothers had at least 12 years of education. Nine percent had less than eight years. The average numbers of years of education was 10.9. (Table 8.)

Table 8

Distribution of Children by Mothers' Education

Level of Education Completed	Frequency	Percent
No education	5	*
Grade 1	3	*
Grade 2	15	*
Grade 3	44	1
Grade 4	48	1
Grade 5	71	2
Grade 6	129	3
Grade 7	91	2
Grade 8	260	6
Grade 9	337	7
Grade 10	534	11
Grade 11	545	12
Grade 12	2,088	44
College - 1 year	204	4
College - 2 years	158	3
College - 3 years	49	1
College - 4 years	116	2
Master's degree	19	*
Graduate study beyond Master's degree	3	*
Total	4,719	100

Mean = 10.9
Standard Deviation = 2.4
*Less than .5 percent.

The distribution of the children according to their mothers' occupations is given in Table 9. Levels 1 through 7 are categories on the Warner Scale of Occupational Status (Warner, 1960). The scale has been updated to include modern job titles. The homemaker category was added for purposes of this study.

Mothers were most often classified as Homemakers (76%). The three levels of the Warner Scale most heavily represented were: Level 5, which includes such occupations as Baker, Fireman, Paper Hanger, Stewardess, and Belly Dancer; Level 6, which includes Route Salesman, Polisher, Truck Driver, and Waitress; and Level 7, which includes Nurse's Aide, Laborer, Janitor, and Maid.

Table 9

Distribution of Children by Occupation of Mother

Occupational Level**	Frequency	Percent
1	2	*
2	71	1
3	29	1
4	36	1
5	306	6
6	420	8
7	313	6
Homemaker	3,820	76
Total	4,997	100

*Less than .5 percent.
**Levels 1 through 7 are categories on the Warner Scale of Occupational Status (Warner, 1960). The homemaker category was added for purposes of this study.
NOTE: Percentages do not total 100 because of rounding.

Fifty-nine percent of the children's fathers had at least 12 years of education. Nine percent had less than eight years. The average number of years of education was 11.1. (Table 10.)

Table 10

Distribution of Children by Fathers' Education

Level of Education Completed	Frequency	Percent
No education	6	*
Grade 1	5	*
Grade 2	11	*
Grade 3	35	1
Grade 4	40	1
Grade 5	68	2
Grade 6	110	3
Grade 7	74	2
Grade 8	210	6
Grade 9	221	6
Grade 10	339	10
Grade 11	342	10
Grade 12	1,496	42
College - 1 year	143	4
College - 2 years	189	5
College - 3 years	34	1
College - 4 years	162	5
Master's degree	40	1
Graduate study beyond Master's degree	19	1
Total	3,544**	100

Mean = 11.1
Standard Deviation = 2.7
*Less than .5 percent
**For 1,701 children, information on fathers' education was not obtained.

The children's fathers were classified most often at Level 6 of the Warner Scale. Level 5 was the second most heavily represented category. (Table 11.)

Table 11

Distribution of Children by Occupation of Father

Occupational Level	Frequency	Percent
1	29	1
2	104	4
3	97	3
4	224	8
5	728	25
6	1,218	42
7	508	17
Homemaker	8	*
Total	2,917**	100

*Less than .5 percent.
**For 2,329 additional pupils, no information was obtained for fathers' occupation.

More than half of the prekindergarten children came from homes with a total family income between $5,000 and $9,999. The mean family income was $6,982. (Table 12.)

Over half of the children's families were supported by the father's income (34 percent), the mother's income (7 percent), or a combination of the two incomes (10 percent). Forty-two percent of the children lived in families whose income came from unemployment insurance, public assistance, or a combination of the two. (Table 13.)

Table 12

Distribution of Children by Family Income

Income	Frequency	Percent
Less than $5,000	1,075	25
$ 5,000- 9,999	2,402	56
10,000-14,999	649	15
15,000-19,999	133	3
20,000 or more	36	1
Total	4,295	100

Mean = $6,982
Standard Deviation = $3,519

Table 13

Distribution of Children by Source of Family Income

Source of Income	Frequency	Percent
Mother's occupation	332	7
Father's occupation	1,633	34
Unemployment insurance and/or public assistance	2,039	42
Mother's and father's occupations	484	10
Mother's occupation and unemployment insurance and/or public assistance	196	4
Father's occupation and unemployment insurance and/or public assistance	159	3
Mother's and father's occupations and unemployment insurance and/or public assistance	29	1
Total	4,872	100

NOTE: Percentages do not total 100 because of rounding.

Almost three-quarters (73 percent) of the children had two or fewer siblings. The average number of siblings at the time the children entered prekindergarten was 1.9. (Table 14.)

Table 14

Distribution of Children by Number of Siblings

Number of Siblings	Frequency	Percent
0	774	15
1	1,771	34
2	1,237	24
3	688	13
4	339	7
5	187	4
6	95	2
7 or more	93	2
Total	5,184	100

Mean = 1.9
Standard Deviation = 1.6
NOTE: Percentages do not total 100 because of rounding.

Most of the children (96 percent) had lived with their families at least four years or for their entire lives. These data were collected in such a way as to determine not only how many children had changed families, as in the case of children in foster homes or adoptive homes, but also to determine how many children's families had changed in composition, as in the case of a parent leaving the family or a grandparent joining the family. It appears that for most prekindergarten children there was stability in the makeup of their families at the time they entered the program. (Table 15.)

Table 15

Distribution of Children by Length of Time Residing with Family

Length of Time	Frequency	Percent
Less than one year	52	1
1 year	44	1
2 years	45	1
3 years	44	1
4 years or entire life	4,313	95
5 years	44	1
Total	4,542	100

About 58 percent of the children lived with two adults while about 34 percent lived with one adult. Eight percent lived with three or more adults. (Table 16.)

Table 16

Distribution of Children by Number of Adults in the Home

Number of Adults	Frequency	Percent
1	1,743	34
2	3,021	58
3	278	5
4 or more	135	3
Total	5,177	100

Mean = 1.8
Standard Deviation = .7

The average number of children in the homes of prekindergarten children was 2.9. Fourteen percent of the children were the only child

in the home. Thirty-four percent lived in homes having two children, including the prekindergarten child, while 24 percent lived in homes having three children. Twenty-eight percent of the children lived in homes having four or more children. (Table 17.)

Table 17

Distribution of Children by Number of Children in the Home

Number of Children	Frequency	Percent
1	729	14
2	1,774	34
3	1,239	24
4	681	13
5	342	7
6	207	4
7 or more	187	4
Total	5,159	100

Mean = 2.9
Standard Deviation = 1.6

More than three-quarters of the prekindergarten children lived in homes having four, five, or six rooms. Nine percent lived in homes having three rooms or fewer, while three percent lived in homes having nine or more rooms. The average home had five rooms. (Table 18.)

Table 18

Distribution of Children by Number of Rooms in the Home

Number of Rooms	Frequency	Percent
1	12	*
2	48	1
3	329	8
4	1,255	29
5	1,162	27
6	881	21
7	312	7
8	162	4
9 or more	125	3
Total	4,286	100

Mean = 5.1
Standard Deviation = 1.5
*Less than .5 percent.

In summary, a composite picture of children in the Experimental Prekindergarten program shows the following:

1. The children are about equally divided between male and female.

2. Black and Caucasian are the dominant racial groups, with about the same number of children belonging to each.

3. English is the predominant primary language, with Spanish a distant second.

4. Most of the children speak one language only; among those having a second language, the second language is most frequently English, followed by Spanish.

5. Most of the children had had no experience in formal educational programs but most had had exposure to other kinds of preschool programs

such as Sunday School, day camp, recreation programs, and nursery school.

6. The majority of the parents had at least a high school education.

7. Homemaker was the occupation of the majority of the mothers; most other occupations listed for the mothers and the occupations of the majority of the fathers fell in those categories containing clerical, sales, service, semi-skilled, and unskilled workers.

8. The children came from homes having an average income of about $7,000. In more than half the cases, the income was derived from the occupations of one or both parents. Forty-two percent were supported solely by some form of public assistance.

9. The majority of the children had no more than two brothers or sisters.

10. Most of the children had lived in the same family group all their lives.

11. The family group of more than half the children contained two adults; for about one-third of the children, the family groups contained one adult.

12. About three-quarters of the children lived in homes containing four, five, or six rooms.

METHOD OF ANALYSIS

The data were analyzed following a multiple linear regression approach to hypothesis testing which was described by Irvine, Hick, and Horan (1976). The approach makes it possible to determine whether the prekindergarten program had an effect on the children while accounting for possible influences of other variables; it also makes it possible to determine whether the program affected different children in different ways.

Using this technique, a traditional analysis of covariance was performed for each of the cognitive measures to determine effects of the prekindergarten program on children's scores on the measure and to determine how several covariates might influence the scores. The criteria for the analyses were the posttests, which were administered in the spring to a sample of approximately 2,000 prekindergarten children and 87 control-group children. Covariates used in the analyses were:

1. Child's age at the time of pretesting.
2. Years of mother's education.
3. Annual income of the child's family.
4. Months between pretest and posttest.
5. Pretest scores on the measure for which posttest scores were used as the criterion.

Additional information on the analytical procedures is contained in a technical report of the findings (Hick, Kukuk, Horan, and Irvine, 1977).

RESULTS

Analyses of covariance were carried out on the children's posttest scores on the Cooperative Preschool Inventory, Walker Readiness Test, and Peabody Picture Vocabulary Test. In each case, the difference between the mean scores of prekindergarten children and control-group children was tested in order to determine the effect of the prekindergarten program. Five covariates were used to account for other possible influences on the scores.

Cooperative Preschool Inventory

On the Cooperative, the control group had a slight, but statistically nonsignificant, advantage on the pretest. However, the prekindergarten group scored 4.8 points higher on the posttest. This difference is statistically significant, indicating that the prekindergarten program had a positive effect on the children's development, as measured by the Cooperative. (Table 19.)

Table 19

Pretest and Posttest Data on the Cooperative Preschool Inventory

Variable Name	Control n=64		PreK n=1,077		Mean Differences	P $M_c = M_{Pk}$
	Mean	SD	Mean	SD		
Pretest	40.5	10.9	38.0	12.2	-2.5	.108
Posttest	46.8	10.8	51.6	8.9	4.8	.001

An analysis was carried out on Cooperative posttest scores for each of the five covariates to discount the possibility that the posttest difference between the prekindergarten group and the control group might be due to differences on the covariates rather than to the prekindergarten program. The difference between the prekindergarten group and the control group on the Cooperative posttest was significant in the presence of each of the covariates and, in the case of three of the covariates, was larger than initially determined.

The most important of the covariates was the level of pretest scores, on which the control group exceeded the prekindergarten group. When pretest scores were used as a covariate, the difference between the two groups was 6.2 points. This indicates that for children scoring at the same level on the pretest, a difference of 6.2 points was found between the prekindergarten children and control-group children on the posttest. Thus, when the initial advantage of the control group is considered, the impact of the prekindergarten program is more evident than indicated by the simple difference between the two groups on the posttest.

Based on the analyses of covariance, it can be said with a high degree of confidence that the prekindergarten program had a positive effect, as measured by the Cooperative, regardless of the child's age at the time of the pretest, the level of the mother's education, the time between the pretest and posttest, income of the family, or the child's score on the pretest.

Walker Readiness Test

On the Walker, the control group again had an advantage on the pretest; the difference was statistically significant. On the posttest, the prekindergarten group scored 5.1 points higher than the control group. This difference is highly significant statistically, indicating that the prekindergarten program had a positive effect on the children's development, as measured by the Walker. (Table 20.)

Table 20

Pretest and Posttest Data on the Walker Readiness Test

Variable Name	Control n=62 Mean	SD	PreK n=1,354 Mean	SD	Mean Differences	P $M_c = M_{pk}$
Pretest	28.3	9.8	24.4	9.6	-3.9	.002
Posttest	33.3	8.3	38.4	6.8	5.1	.001

A more accurate appraisal of the impact of the prekindergarten program can be obtained by considering differences between the prekindergarten group and the control group on the pretest and the other covariates.

Family income and months between pretest and posttest were found not to affect Walker posttest scores. Two variables, age at time of the pretest and score on the pretest, were found to be significantly related to the posttest score. The most important covariate was the level of pretest scores. When pretest scores were used as a covariate, the difference between the prekindergarten group and control group on the posttest was

6.5 points. As in the case of the Cooperative, when initial status of the children is considered, the difference between the prekindergarten group is larger than the simple difference between the groups.

The analysis using mother's education as a covariate showed an interaction between mother's education and scores on the posttest. The analysis showed that the effect of the prekindergarten program is greater for children whose mothers have less education and smaller or nonexistent for children of better educated mothers.

In summary, the analyses of covariance indicate that the prekindergarten program has a positive effect on children's Walker posttest scores. This effect is unaffected by the income of the family or the months between pretest and posttest. The effect is shown to be even larger when pretest scores and children's ages at time of pretest are considered. Finally, the effect is greater for children whose mothers have less education.

Peabody Picture Vocabulary Test

On the Peabody, the prekindergarten group scored significantly below the control group on the pretest. On the posttest, the difference had virtually disappeared; the difference between the two groups was not significant. (Table 21.)

Table 21

Pretest and Posttest Data on the Peabody Picture Vocabulary Test

Variable Name	Control n=34 Mean	SD	PreK n=595 Mean	SD	Mean Differences	P $M_c = M_{pk}$
Pretest	47.4	11.6	40.6	12.6	-6.8	.002
Posttest	53.4	10.1	52.2	10.5	-1.2	.496

The simple difference between the groups on the posttest does not consider the pretest difference, which was substantial. Analysis of covariance, using pretest scores as a covariate, was carried out to take the pretest difference into account. When the pretest is considered, the difference between the groups favored the prekindergarten group by 2.6 points, but this difference is not statistically significant.

Analyses were made using the other four covariates. When three covariates (age at time of the pretest, level of mother's education, and family income) were considered, there was no difference between the prekindergarten group and the control group. In the other analysis of covariance, a treatment effect was identified which varied with the number of months between the pretest and posttest. For children who had only four months between the pretest and posttest, the control group performed better than the prekindergarten group on the Peabody posttest by about 8 points. However, for children who had six months between pretest and posttest, the prekindergarten group scored about 6 points above the

control group. Because the range in months between pretest and posttest was only from four to six months for the control group, special attention should be given to effects on the Peabody when the study of a second wave of prekindergarten children is conducted.

In summary, analyses of covariance of Peabody posttest scores did not show a significant effect of the prekindergarten program, even in the presence of five covariates. However, a significant interaction was found between time between pretest and posttest and the treatment.

CRITIQUE OF THE STUDY

A number of problems exist in the analyses reported here. The "pretesting" did not begin until the middle of November, with the bulk of the pretesting taking place between that time and the Christmas break in December. For that reason, the pretest-to-posttest interval was shorter than it will be for succeeding waves. The short interval may reduce the likelihood of obtaining a true picture of the prekindergarten effect.

Loss of children from the study because they moved out of participating districts reduced the size of both the PreK group and the control group. This will become a more serious problem as the study continues. The sampling plan adopted for the study calls for replacement of lost children from the pool of children tested at the beginning of prekindergarten. However, in seven districts all children are being studied so that no replacements are available for them. In addition, present plans call for random replacement within districts of lost children; this could result

in an unrepresentative sample, since the lost children may not be a random group. A comparison of the sample studied here and the pre-kindergarten population indicates that the sample used in the analyses reported here is representative on key dimensions.

The control group is not comparable to the PreK group in ethnic distribution. However, it is comparable on other dimensions, including distribution by sex, father's occupation, mother's occupation, and proportion of English-speaking versus non-English-speaking children. Two other factors—mother's education and family income—were used as control variables in the analyses of covariance.

The small size of the control group relative to the PreK group raises a question about the appropriateness of the F-statistic, used in these analyses, as the test of significance. Additional study is being given to identify more appropriate procedures. The problem will be less serious when the children are studied in kindergarten since a substantially larger control group is being obtained at that level.

Problems in administering the Peabody Picture Vocabulary Test were identified when analysis of data began. As a result, data were dropped for a number of children for whom correct Peabody scores could not be obtained. In addition, a number of errors were apparent in results for non-English-speaking children (to whom the test was to be administered in English), resulting in a decision to analyze results only of English-speaking children in the PreK group and the control group.

Finally, this report describes results obtained with three cognitive measures. It is not presented as a complete picture of the impact of the Experimental Prekindergarten Program.

THE INDEPTH STUDY

Special efforts are being concentrated in seven "indepth" districts to develop greater continuity between prekindergarten, kindergarten, and grades one through three. The purpose of these efforts is to determine what factors contribute to the maintenance over a period of time of gains made by children in prekindergarten.

A field coordinator works with the staffs in the indepth districts to develop skills in observing children and recording the observations, diagnosing needs of children and planning activities to meet those needs, and linking approaches and activities between grade levels. All of the children in the indepth districts were posttested in the spring of 1976, rather than a sample, as was done in the other districts. Additional data were collected on selected children. These data include teachers' documentation of children's development, including background information, medical records, anecdotal material, record of parent contacts, samples of children's work, summary of teachers' records, sociograms, and similar information.

A general pattern of organization was developed for conducting activities in the seven indepth districts with some variation from district to district. A local leadership team was established in each district, headed by a liaison person designated by the superintendent. The team coordinated activities and provided communication within the district to facilitate the work of the field coordinator.

The field coordinator facilitated and coordinated staff development activities designed to develop and improve skills of observation and recording. Working with the field coordinator, consultants assisted staff members in studying and documenting individual children's growth. Workshops, meetings, and materials related to documentation provided additional support for staff development.

During 1975-76 the field coordinator worked primarily with the kindergarten teachers in the indepth districts while the testing focused on the prekindergarten children. Thus, the field coordinator was working with the teachers who would teach the prekindergarten children during the next school year, not with the teachers who were teaching the children during the year for which results are presented in this report. For that reason, indepth study is described here for informational purposes; results of activities in the indepth districts will be analyzed with data from the 1976-77 school year and presented in subsequent reports.

SUMMARY AND CONCLUSIONS

The Prekindergarten Evaluation Project is investigating questions related to the short- and long-range effects of the Experimental Prekindergarten Program. Samples from a population of 5,245 four-year-old prekindergarten children and a control group of 87 children are being studied.

Analyses of covariance were carried out on three measures of cognitive development with one of five variables used as covariate in each analysis. A significant positive effect of the prekindergarten program was found for two of the measures, the Cooperative Preschool Inventory and the Walker Readiness Test. With one exception, the PreK effect was significant over all levels of the control variables; the PreK effect on Walker scores was greater for children whose mothers had less education.

Analyses of covariance of Peabody Picture Vocabulary Test scores did not show a significant PreK effect, even in the presence of the control variables. A significant interaction was found between the number of months between pretest and posttest and the treatment: among children who had only four months between testing, the control group performed better than the PreK group; among children who had six months between testing, the reverse was found.

These analyses provide evidence that the Experimental Prekindergarten Program has a positive effect on certain aspects of cognitive development. Future analyses will be designed to corroborate this conclusion, to reveal more about the nature of the effect, and to study the effect on children over an extended period.

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